

Atmospheric Radiation Measurement (ARM) User Facility

NICKI HICKMON

ARM Associate Director for Operations

Tools For Future



- ▶ ARM tool development is working to get each piece of this data efficiently captured for efficient propagation to all tools
- ▶ Future filtering and customization of information
- ▶ Interfaces for user, mentors, translators, management
 - Troubleshooting
 - Discovering
 - Monitoring
 - Data Analysis

The screenshot displays the ARM Data Center interface for the MET (Cold Air Outbreaks) dataset. The interface is divided into several sections:

- Header:** MET, Data Epoch: 1, Cold Air Outbreaks.
- Selected data level:** b1, Start: 2019-12-01, End: 2020-06-02.
- Description:** Surface Meteorological Instrumentation.
- Site:** Andenes, Norway; Cold-air Outbreaks in Marine BL Exp (COMBLE) (ANX).
- Location:** Andenes, Norway; AMF1 (main site for COMBLE).
- Facility Code:** M1.
- Category:** Surface Meteorology.
- Data Type:** Routine Data.
- Source Instrument/Data:** Surface Meteorological Instrumentation.
- Sampling Interval:** variable, see instrument handbook.
- Start Date:** 2019-12-01.
- End Date:** 2020-06-02.
- DOI:** 10.5439/1786358.
- Citation Format:** Select.
- Data Timeline & Quality:** A timeline view showing data quality (ROUTINE, INCORRECT, SUSPECT, MISSING, NOTE, LIMITED ACCESS) from December 2019 to June 2020. The timeline is currently set to 'atmos_pressure'.
- Data Plots:** Four small plots showing data trends over time.
- Primary Measurements:** A section with tabs for 'Primary Measurements', 'File Header Information', and 'Data Epoch Beta'.
- VARIABLES:** A list of variables available for the dataset, categorized by type (Atmospheric pressure, Precipitation, Horizontal wind, Atmospheric moisture, Atmospheric temperature).
- Instrument Contacts:** A list of contacts including Jenni Kyrouac (Lead Mentor) and Matt Tuftedal (Associate Mentor).
- Additional Resources:** Links to Instrument/VAP Info, Campaign Information, Instrument Handbook, and Related Publications.
- Footer:** MET, Actions, Visualize Data, Tag this Data, Add to Cart.

New ARM Calibration System



- ▶ Digitizing Calibration Plans
 - Data Discovery
 - Public-Facing Record Viewer
- ▶ Assigning Calibration Events to Assets
- ▶ Dissemination of Calibration Information
 - Webpage
 - News Stories
 - Webinar

Calibration Report
Date: July 8, 2022
ARM
Perf
Calif

Calibration Report
Date: August 7, 2023
ARMID: 11242
Performed by: Michael Ritsche
Calibration Results
a: 52
m: 1.01
b: 20

Each asset has a unique ARMID that reports can be linked to

No matter where it goes or what system that asset is installed in, these reports will be connected to that ARMID

ARM Operations Dashboard (Local)

Dashboard

Instrument Calibration

Calibration Plan Creator
Calibration Plan Search
Calibration Record Entry
Calibration Record Search

Field Campaign Admin
Asset Management
Location Admin
Facility Dashboard

Calibration Plan Creator

Fields marked with * are required.

Calibration Plan: * SP2-D Version: 1 Instrument Type (Instrument Class): * sp2 - Single Particle Soot Photometer

Calibration Type: * Calibration Performed By: * Mentor

Calibration Equipment (Product): * TSI Inc., 308600, Nanometer DMA Notification: * Observatory

Interval: * 6 Months Reminder: * 1 Month Prior

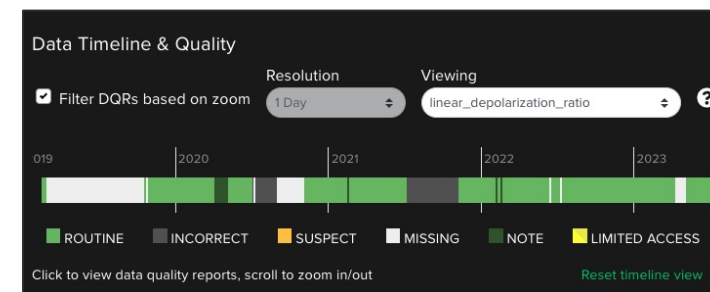
Procedure: *

1. Start SP2 and DMA, take 10 data points with nominal particle size between 80 and 500 nm.
2. Shut off DMA and SP2
3. Process data files and analyze histograms generated for each particle size. Recommend first data analysis be conducted with mid-range-size particles
4. Calculate particle mass for each size and plot mass vs max peak height. This should be a polynomial and the parameters will form calibration of SP2

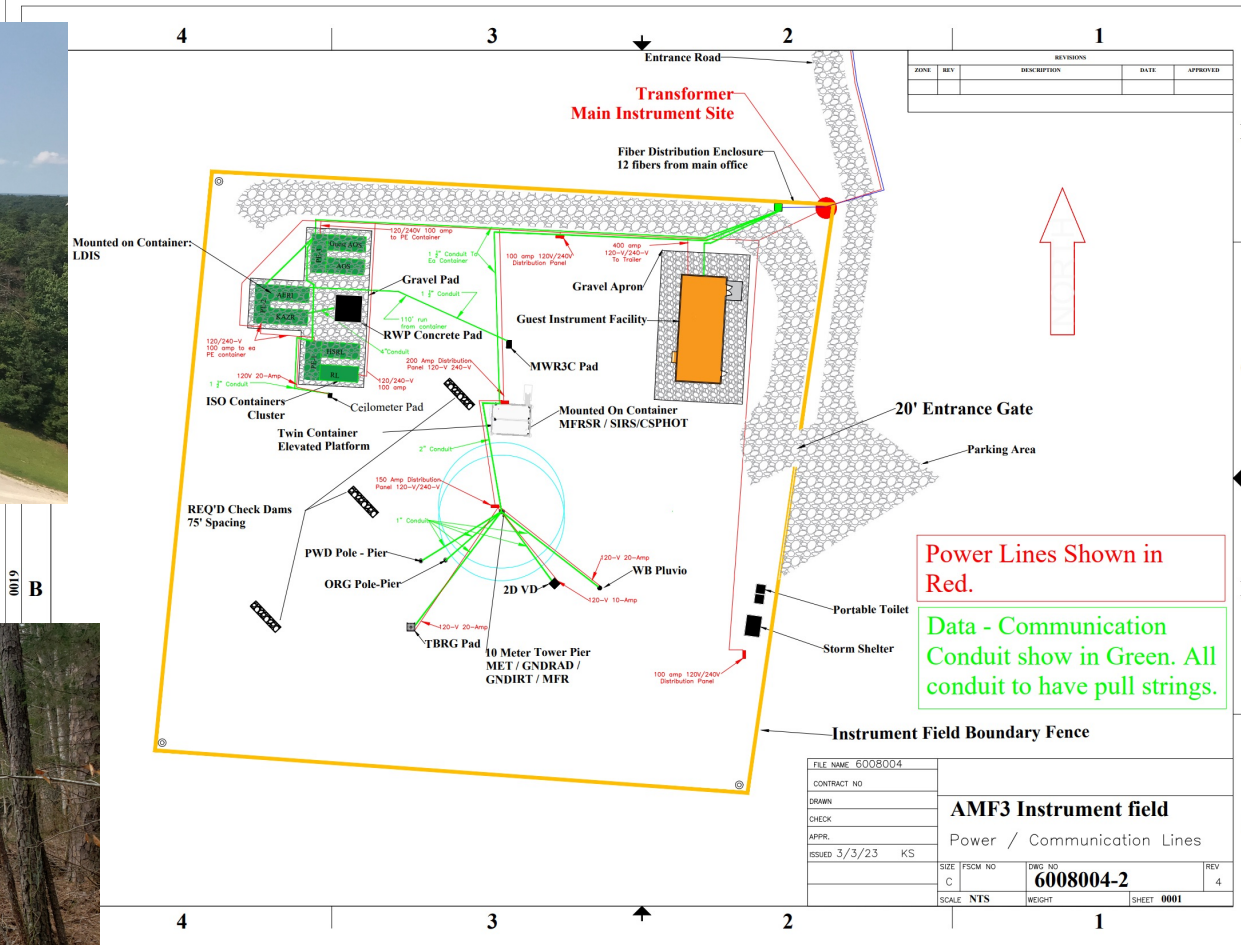
Expected Results: *

Variable	Type	Short Description	Reset	Remove
a1	Float	Slope offset	Reset	Remove
b1	Integer	Number of Samples	Reset	Remove
x1	Float	Slope	Reset	Remove

Add Additional Result



AMF3 Bankhead National Forest (BNF)



Workforce Development Coordination



- ▶ Collaborative short courses, workshops, tutorials, and su
- ▶ Available & reusable educational material & examples
 - <https://arm-development.github.io/ARM-Notebooks>
- ▶ Past Events:
 - AMS Annual meeting short course
Open Science In the Rockies (Dan Feldman)
 - AMS Radar Meeting: Open Radar Science
- ▶ Future Events:
 - AMS Annual Meeting
 - FY25 ARM summer school



Q Search this book...

Open Science in the Rockies - AMS
Short Course 2023

RADAR WITH PY-ART

Py-ART Basics
Py-ART Gridding

OBSERVATIONS WITH ACT

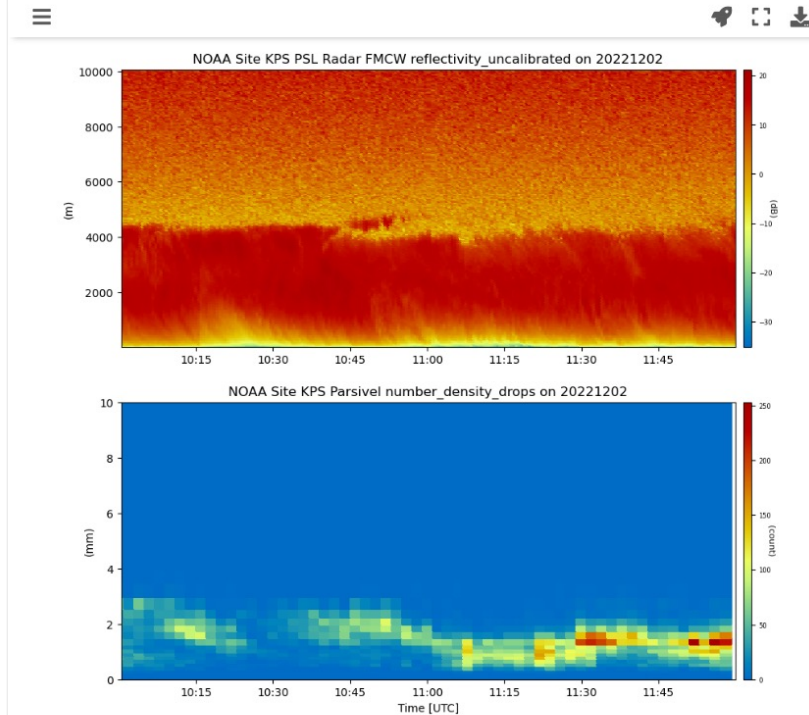
ACT Basics
Plot Aerosol and Meteorological Data
from SAIL

PANGEIO + XARRAY

Introduction to Xarray



Powered by Jupyter Book



In-Situ Precipitation Accumulation at the AMF2 site

```
username = 'armlive_training'
token = '6f097a7b99e39d19'

# Access the laser disdrometer data
laser_disdrometer_files = act.discovery.download_data(username=username,
                                                       token=token,
                                                       datastream="guclm1.b1",
                                                       startdate="2022-12-02",
                                                       enddate="2022-12-02")

# Read the laser disdrometer data into an xarray dataset
laser_disdrometer_ds = act.io.read_netcdf(laser_disdrometer_files)
```

Open Source



<https://github.com/ARM-Synergy>

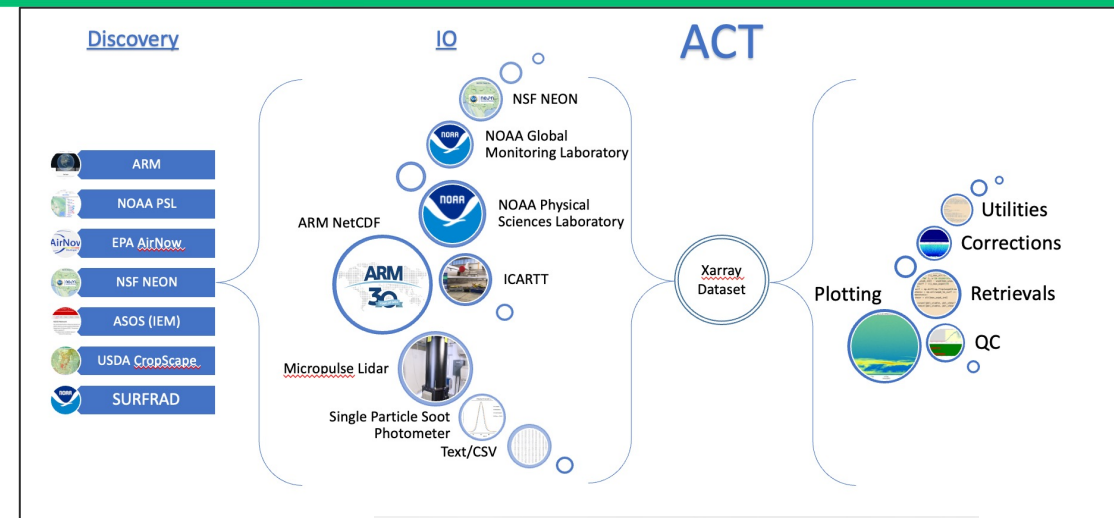
<https://github.com/ARM-Development>

<https://github.com/ARM-DOE>

- ARM data Community Toolkit (ACT)
- Python-ARM Radar Toolkit (PyART)
- ARM data-oriented diagnostics package for climate model evaluation
- ARM data integrator
- Camspec-air

Related Open Source Highlights

- PyFLEXTRKR (Python FLEXible object TRacKeR)
- EMC2 (Earth Model Column Collaboratory)
- tobac (Tracking and Object-based Analysis of Clouds B)



Feature	Priority	Status
Aircraft or UAS Related Functionality	High	Ability to read ICARTT data added but no work on visualizations or quality control yet
Retrievals	High	PBL Height using Heffter method SP2 retrievals using PySP2
Windows Compatibility ✓	High	Continuous integration tests running on windows VMs
ARM Data Surveyor ✓	High	Command line interface for basic ACT plotting now in ACT's scripts directory
Performance Improvements ✓	High	Implemented Lazy Loading to greatly improve import speed.
Statistics Tracking ✓	Medium	Logging daily statistics from GitHub traffic
I/O Improvements	Medium	NOAA, NEON, and SURFRAD readers were added but more could be done
Tutorial and Example Development ✓	Medium	New and improved example gallery with expanded examples
Discovery Improvements	Low	NOAA, NEON, SURFRAD, EPA discovery modules but more could be done
Visualizations	Low	Violin, scatter, and <code>groupby</code> plotting functionality added in but more is needed (Pie, interactive, etc...)

Table 1. Priorities and current status of tasks from the second ACT roadmap.
✓ indicates tasks that the ACT development team considers complete.